Lessons Learned From the Bald Eagle

Discovering Our Watershed Fieldtrip
Saginaw Bay Visitor Center
Bay City State Recreation Area

Level: 4th, 5th or 6th Grade

FIELD TRIP PROGRAM DESCRIPTION:
Discovering Our Watershed Field Trip (3.5-4 hours):

This program focuses on the importance healthy environment plays in every living creature's existence, the factors which indicate good water quality and how man is part of the water pollution problem and solution. The program includes:

Arrival (15 minutes): Arrive at park and divide students into groups and go through station instructions.

Station 1 (1 hour): This station includes a tour of the visitor center museum, which includes a point source – non-point source pollution display, a run-off game, a review of the Lesson Learned From the Bald Eagle and the opportunity to play a computer touch screen virtual fishing scenario where ultimately the student must catch, measure, and ID a fish then use the Michigan Fish Consumption Advisory to determine whether they will eat it or not.

Station 2 (30 minutes): Utilizing live mounts and the museum students are introduced to common and endangered fish and wildlife that are found in the Saginaw Bay watershed, their traits and characteristics, predator prey relationships, habitat needs and man's impact on their populations.

Station 3 (1.5-2 hours): Ecology Hike - Students will also explore the freshwater coastal ecosystem on a hike out to the Saginaw Bay traveling through wooded wetland, thicket, wet prairie, marsh, pond, dune and Great Lakes shoreline communities. As they hike they survey its living and non-living components, take and compare and contrast soil samples and macro-invertebrate samples, and take note of man's use of the land and the Saginaw Bay and the possible impact it has on the ecosystem.

PROGRAM GOALS:

1. Each student will see the connection between environmental quality of the Bay and the health of the food web within the ecosystem, and have a better understanding how man is a part of the pollution problem and solution.

PROGRAM OBJECTIVES:

1. Each student will be able to list at least three pollutants which effect the watershed and how they are introduced into the Saginaw Bay's ecosystem.
2. Each student will be able to describe sediment as a pollutant which decreases water quality (sedimentation).
3. Each student will be able to describe how nutrients can decrease water quality (nitrification).
4. Students will be able to describe how wetlands help keep our water clean.
5. Students will be able to describe the physical characteristics of three birds of prey and of three fish that help them survive in their environment.
6. Students will be able to describe a behavioral characteristic of the bald eagle, and three fish that help them survive in their environment
7. Students will be able to identify factors in the Great Lakes aquatic ecosystem that influence changes in fish and bird populations.
8. Students will be able to describe different members of a Great Lake's food chain/food web and their place in it.
9. Students will be use the MDCH Fish Consumption Advisory Guide to determine if their fish is safe to eat using a virtual fishing game.

PRE-VISIT SUGGESTIONS:

1. Call the visitor center to make you pre-visit classroom program scheduled for part one of you Lessons Learned from the Bald Eagle.
2. Be sure that every student is dressed for the weather conditions. Layers work best. Our weather can be 10 to 15 degrees cooler near the Bay than at your school site. Tell them to wear shoes which can get muddy. If it is winter and we have snow, students will have the opportunity to use snow shoes so boots must be worn.
3. Review Vocabulary: watershed, wetland, conservation, macro invertebrate, environment, sediment, turbidity, photosynthesis, oxygen, carbon dioxide, nutrients, pollutant, herbicide, pesticide, bio-accumulation, toxic, persistent, precipitation, run-off, condensation, evaporation, predator, prey, abiotic, biotic, parasite, competition.

POST-VISIT SUGESTIONS:

1. Make a chart or table comparing and contrasting the data collected by each group on their ecosystem survey hike. Graph the data collected.
2. Keep a class scrapbook on newspaper articles regarding the Dioxin issue and other incidents which affect the water quality of the Saginaw Bay.
3. Follow up this program by participating in a fishing trip like, Fishing for Fun.
4. Teachers attend Project WET or Project WILD workshop and get two books bulging with fun interdisciplinary, cross-referenced, hands-on lesson plans for water studies.
5. Conduct the Project Wild Lesson: "What's in the Water?"; "Deadly Links" (this is a terrestrial version of the aquatic version of the game that we played with your class, then review the Eat Safe Wild Game with them)
6. Have the students design their own fish, name it and describe its food, water, shelter and space requirements (or Project Wild lesson: Fashion a Fish).
7. Visit a DNR Fish Hatchery.
8. Participate in the all new DNR classroom program "Salmon in the Classroom"
9. Participate as a class in the BAY SAIL program. Information on BAY SAIL is available from the Bay Area Visitors and Convention Bureau.
10. Obtain a list of land use precautions that the EPA has identified for people living or using land that has been contaminated by the dioxin in our area.
11. Have the students highlight on a county map or state map the floodplain areas contaminated with the dioxins.
12. Contact the Saginaw U.S. EPA office and see if a field agent is available to make a visit to your classroom or if they can make supplementary classroom materials available to your students. Mary Breeden, breeden.mary@epa.gov.
13. Contact Saginaw or Bay County Health Department and ask for information on other environmental health programs which are available for your students.

COORDINATING WITH MICHIGAN SCIENCE Grand Level Content Expectations:

Bold & Underlined=prominent program emphasis, Bold=reinforced through program, Italicized=program can be used to reinforce back in classroom

Science. Inquiry Process:

S.IP.04.11, **S.IP.04.12**, *S.IP.04.13*, **S.IP.04.14**, **S.IP.04.15**, *S.IP.04.16*,
S.IP.05.11, *S.IP.05.12*, **S.IP.05.13**, **S.IP.05.14**, *S.IP.05.15, S.IP.05.16,*
S.IP.06.11, **S.IP.06.12**, **S.IP.06.13**, **S.IP.06.14**, *S.IP.06.15, S.IP.06.16,*

Science. Inquiry Analysis & Communication:

S.IA.04.11, **S.IA.04.12**, *S.IA.04.13*, *S.IA.04.14*, *S.IA.04.15*,
S.IA.05.11, S.IA.05.12, S.IA.05.13, S.IA.05.14, *S.IA.05.15*,
S.IP.06.11, **S.IP.06.12**, **S.IA.06.13**,

Science. Reflection & Social Implications:

S.RS.04.11, **S.RS.04.14**, **S.RS.04.15**, *S.RS.04.16*, *S.RS.04.17*, **S.RS.04.18**, *S.RS.04.19*,
S.RS.05.11, **S.RS.05.12**, **S.RS.05.13**, **S.RS.05.15**, *S.RS.05.16*, **S.RS.05.17**, *S.RS.05.19*,

S.RS.06.11, **S.RS.06.12, S.RS.06.13, S.RS.06.14, S.RS.06.15**, *S.RS.06.16*, **S.RS.06.17**, *S.RS.06.18, S.RS.06.19*

Physical Science. Changes in Matter: P.CM04.11

Life Science. Organization of Living Things:
L.OL.04.15, **L.OL.04.16**,
L.OL.05.41, *L.OL.05.42*,
L.OL.06.51, L.OL.06.52

Life Science. Heredity: L.HE.0511

Life Science. Evolution:
L.EV.04.21, *L.EV.04.22*,
L.EV.05.11, L.EV.05.12, **L.EV.05.14**, **L.EV.05.21**

Life Science. Ecosystems:
L.EC.04.11, L.EC.04.21,
L.EC.06.11, **L.EC.06.21**, **L.EC.06.22**, **L.EC.06.23**, **L.EC.06.31**, **L.EC.06.32**, **L.EC.06.41, L.EC.06.42**

Earth Science. Earth in Space & Time:
E.ST.04.12, *E.ST.05.25*

Earth Science. Solid Earth:
E.SE.06.11, **E.SE.06.12**, **E.SE.06.13**

COORDINATING WITH M.E.A.P. SOCIAL STUDIES CONTENT STANDARD BENCHMARKS:
(underway GLCE's correlation)

Geographic Perspective	Civic Perspective	Public Discourse & Decision Making
II.1—I.e.2	III.3—I.e.2	VI.1—I.e.1, I.e.3
II.2—I.e.1, I.e.2, I.e.3, I.e.4	II.4—I.e.2	
II.4—I.e.5 & **II.5—I.e.1**		

Common Core

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and
populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and
growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
[Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between
organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an
ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on
defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an
ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes
in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* [Clarification Statement:
Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could
include scientific, economic, and social considerations.]

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy,
and groundwater resources are the result of past and current geoscience processes. [Clarification Statement: Emphasis is on
how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of
uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and
subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering
and/or deposition of rock).]

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development
of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe
weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet
predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting
and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the

natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-
prone regions or reservoirs to mitigate droughts).]

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*
[Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and
designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams
and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the
air, water, or land).]

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption
of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human
populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the
appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and
consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past

century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and
natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities
play in causing the rise in global temperatures.]